utilzied, respectively, for storing program instructions to implement the present administration feature and the data associated therewith.

FIG. 2 shows a typical terminal or station set for use with the communication system shown in FIG. 1. The station set is connected to common controller by a 4 pair cable 201. Two of the pairs provide two voice channels, one pair provides for station set power, and one pair provides control signals. The station set signaling over the control pair is described in copending U.S. Patent application Ser. No. 443,392, filed by T. H. Judd on Nov. 22, 1982, now U.S. Pat. No. 4,454,383 issued on June 12, 1984. The station set includes mode select switch 201 used to select the programming or station administration mode of operation. In one embodiment, during the administration mode of operation, several buttons of a preselected control station assume different functions. For example, button 202 becomes the pool administration button (ADM POOL), button 203 becomes the station administration button (ADM STA), button 204 becomes the miscellaneous administration button (ADM MISC), button 205 becomes the toll administration button (TOLL), and button 206 becomes the night service administration button (NGHT SRV). The red light-emitting-diode (LED) and green LED associated with each of these buttons provides visual signals to indicate to the user the status while in the various administration modes. An audio output provides additional status and alert signal to the administrator or user. The key pad 207 provides the entry of station numbers and other data during any of the administration modes. Since the operation of the other buttons and LEDs of the station set are not relevant to the present invention, they are not described herein. It should be noted that a direct station select (DSS) capability may be incorporated as part of the station set or can be provided by a separate unit. This DSS capability can be used to enter station numbers directly.

FIG. 3 shows an embodiment of the software architecture utilized in the system shown in FIG. 1. A more detailed description of the command flow in the control module software can be found in copending U.S. Patent Application Ser. No. 523,092, filed by Carson et al on Aug. 15, 1983, now U.S. Pat. No. 4,560,837 issued on Dec. 24, 1985. To facilitate the addition of or changes to system operating features, the system is partitioned into a feature program (FP) module 31 and a personality program (PP) module 32. Both the feature program and personality program reside in ROM 108.

The following paragraphs provide a background for understanding the disclosed system/station administration arrangement operation in the embodiment of the software architecture block diagram shown in FIG. 3. The software block diagram of FIG. 3 shows the feature program as including call director 301, administration translation director 311, a group of terminal managers 302-1 through 302-N, and the terminal feature dependent parts of the group of terminal adapters 303-1 through 303-N. The disclosed administration arrangement requires one terminal manager and terminal adapter to interface each station set ST1-STN of FIG. 1. FIG. 3 also includes translation manager 314 and translation adapter 313 for accessing inputs from switches on control translation 114 of FIG. 1. Additionally, terminal manager 302-1 includes a terminal manager administrator (TMA) program 312 which enables the station set ST1 serviced by I/O adapter 306-1 to act as the central administration position CAP.

In FIG. 3, the personality program includes network manager 304, network adapter 305, line managers 207-1 through 207-M and a variety or apparatus adapters including line adapters 308-1 through 308-M, paging manager 309, paging adapter 310 and the input/output portion of the terminal adapters 306-1 through 306-N. These apparatus adapters of the personality program are hardware dependent modules, also known as hardware driver programs, which interface the system to the specific apparatus or hardware (e.g., station sets ST1–STN line circuits 102, etc.). These apparatus adapters are responsive to control commands for enabling or disabling communications with the connected apparatus.

Network adapter 305 receives hardware status from and transmits hardware stimuli to switch network 101. The network adapter decodes requests, updates network hardware status, and generates call progress tones. The network adapter converts the raw hardware dependent variables into a hardware independent language for communication to network manager 304. Thus, network adapter 305 translates specific hardware signals to and from functional language commands to make or clear connections to specified ports or links of the network.

Line adapters 308-1 through 308-M scan the CO line circuits 102 for changes in the state of the CO lines (CO1–COM) and report any changes in a hardware independent language to the associated line managers 307-1 through 307-M. Each line adapter receives commands from its line manager which are decoded and executed in hardware dependent language. Thus, each line adapter and associated line manager interface each CO line to the system. This line interface generates and receives hardware signals which enable the system to perform the standard CO line functions such as conferencing, queuing, dialing, disconnection, holding, outpulsing, timed flash, seizing, busying out and tone signaling.

Similarly, paging adapter 310 receives and outputs hardware stimuli to interface to various paging devices. Paging manager 309 receives and transmits device independent commands to control paging adapter 310.

Terminal I/O adapters 306-1 through 306-N interface station sets ST1–STN with control logic 102. Control logic 102 includes circuitry which periodically polls the connected station sets ST1–STN (or other voice or data communication devices) and receives status therefrom. Each of the terminal adapters receives information from an associated station set which is consolidated from a polling operation performed by control logic 102. This information includes various arguments to specify the call priority, station identification, button type, and button identification. Each of the terminal I/O adapters 306-1 through 306-N converts this hardware-dependent information or signals into a hardware-independent language which is communicated to the associated hardware-independent terminal adapters 303-1 through 303-N. The communications or commands between the terminal managers 302-1 through 302-N and terminal adapters 303-1 through 303-N updates various visual, audible and button states of the station sets connected to the system. These commands turn off, turn on, flutter, wink, or flash the red or green light-emitting diode of the station sets, or enable voice or tone signaling from the station sets. One method of providing the tone signaling at the station sets is disclosed in copending U.S. Patent application Ser. No. 443,391, filed by T. H. Judd